

7.3 Length of a smooth curve

Approximate the length of the curve $y = \sin(x)$ from $x = 0$ to $x = 2\pi$

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Definition of arclength

$$L = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx$$

$$L = \int_c^d \sqrt{1 + \left(\frac{dx}{dy}\right)^2} dy$$

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Find the exact length of the curve $y = \frac{4\sqrt{2}}{3}x^{3/2} - 1, 0 \leq x \leq 1$

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A vertical tangent

Find the length of the curve $y = \sqrt[3]{x}$ between $(-8,-2)$ and $(8,2)$

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A cusp

Find the length of the curve $y = x^2 - 4|x| - x$ from $x=-4$ to $x=4$

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